(RVP), varies from approximately 7 pounds per square inch (psi) during the summer months to as much as 12 psi during the winter months, depending on location in the State. High fuel volatility correlates strongly with fuel pressure spikes during and immediately following pressurization of the system, decreasing the pressure drop observed.

Fuel vapor pressure is also strongly dependent on fuel temperature. A summer fuel, for instance, may have a vapor pressure of 13 psi at 120° F fuel temperature, but 4 psi or less at 60° F. Both fuel temperatures are experienced during the summer months in California, with 120° F being a possible tank temperature at the completion of an hour-long drive during a 95° F day, and 60° F occurring at the beginning of a drive during a 55° F morning. It is for these reasons that the attached tables are also indexed by estimated fuel temperature. Estimated fuel temperatures outside the range of temperatures explicitly covered by the tables are taken as occurring at the appropriate endpoint temperature. The liquid fuel temperature is estimated by using the measured ambient temperature at the time of testing, and then adding to this number a pre-determined value known (based upon previous field testing) to provide the best correlation of estimated fuel temperature with actual fuel temperature.

The pass-fail cutpoints are the result of extensive laboratory testing with representative fuels, using a procedure substantially similar to that to be used in actual in-use testing. The procedure used in the laboratory testing entails a pressurization using recently compressed nitrogen. As this nitrogen decompresses prior to introduction into the vehicle fuel tank, it attains a cold temperature. The introduction of this cold gas into the warm fuel tank causes a condensation of the fuel vapor into fuel liquid. It is the compensatory re-heating of this vapor by the liquid fuel (whose temperature remains largely unchanged) that causes the pressure spikes described earlier. These tables are thus most accurate for pressurization tests using decompressed nitrogen. However, the scope of the test method described in this application also extends to pressurization procedures using compressed air, or other gases. The scope should also be understood to apply to the use of tables incorporating a different leak threshold diameter. Finally, the scope should be understood to apply to revised tables for use when compressed air, or other means, is being used for pressurization.

Claim

What is claimed is:

1. A method for leak-testing a motor vehicle fuel tank and associated evaporative emissions control system, comprising:

the use of a pressure regulator system, comprised of orifices attached to a nitrogen or compressed air source, to deliver gas from such source at a specified pressure measured by a pressure transducer, to the evaporative emissions system of a gasoline-

powered motor vehicle until the pressure of such system is approximately 14 inches of water (about .45 pounds per square inch) above atmospheric pressure;

the use of look-up tables to determine an appropriate pass-fail decision cutpoint, based on measured drop in tank pressure over a 120-second period, such tables incorporating the estimated liquid fuel temperature, and time of year (affecting fuel volatility) into the decision cutpoint;

the use of decision-tree logic to determine whether a vehicle has a leak sufficiently large that pressurization is impossible and the vehicle is deemed to fail the test;

the use of an electronic interface between the pressurization device and an on-line computer system which issues commands for the effective control of the pressurization device.